



Department of Materials Science and Engineering Seminar Series 2024

Redox Mediated Electrified Methods for Spent Lithium-ion Batteries Cathode Materials Recycling

Huang Songpeng

Date and time: 5 April 2024, Friday at 10:00 AM

Venue: E3-06-10 TUTORIAL ROOM

Abstract

The surging demand for lithium-ion batteries (LIBs) in stationary energy storage and electrical vehicle in past decades has raised the necessity for recycling of spent batteries, especially cathode materials which contains valuable metal species. Current industrially deployed recycling technologies, hydrometallurgy and pyrometallurgy are either chemical-intensive or energy-intensive, which leads to low environmental benignity. Electrometallurgical methods are promising with low environmental impacts, but the direct electrolysis process has low scalability. Recently, redox mediated electrified methods have been proposed with electrochemically regenerative redox mediators as leaching agents, which enables operations on a large scale. However, a universal approach that can be applied to different types of cathodes for leaching and metal recovery has yet to be established. The main objective of this thesis is to develop scalable redox mediated electrified systems for recycling various LIB cathodes including LCO, LFP and NMC, which incorporate closed-loop reaction pathways to minimize chemical and energy consumption.

Biography

Huang Songpeng obtained his Bachelor of Engineering in Materials Science and Engineering in National University of Singapore in 2016. He is currently a PhD candidate under the supervision of Professor Wang Qing. His research interests focus on redox mediated electrified methods for lithium-ion battery recycling.

Please join us!

HOST: Associate Professor Ouyang Jianyong